

## 16.6: Solving Equations Containing Exponents

Ex:  $\frac{1}{4} x^{2/3} + 1 = 10$

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### Procedure: Solving Eq. with Exponents

- 1) Use inverse operations to get the quantity being raised by itself.
- 2) **RAISE** both sides of the equation to the reciprocal power of the exponent.
- 3) Evaluate and solve
- 4) Check solution(s)

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Solve for  $m$ :  $3^{m+1} - 5 = 22$

Meteorologists can determine how long a storm lasts by using the function  $t(d) = 0.07d^{\frac{3}{5}}$ , where  $d$  is the diameter of the storm, in miles, and  $t$  is the time, in hours. If the storm lasts 4.75 hours, find its diameter, to the *nearest tenth of a mile*.

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Tools Comment

### EXERCISES WITH OPEN-RESPONSE PROBLEMS

In 1–4, find the value of  $a$  for which each expression is equal to  $x$ .

- $(x^{\frac{1}{3}})^a$
- $(x^{\frac{2}{3}})^a$
- $(x^{-6})^a$
- $(x^{-\frac{1}{3}})^a$

In 5–16, solve each equation and check. All variables represent positive numbers.

- $x^{\frac{1}{3}} = 7$
- $x^{\frac{1}{3}} = 5$
- $x^{\frac{2}{3}} = 4$
- $y^{-2} = 9$
- $a^{-\frac{1}{4}} = 2$
- $b^{-\frac{1}{2}} = \frac{1}{3}$
- $x^{\frac{1}{3}} - 1 = 15$
- $y^{-\frac{3}{2}} + 2 = 10$
- $2x^{\frac{1}{3}} = 162$
- $2x^{-\frac{1}{4}} + 3 = 4$
- $4x^{\frac{2}{3}} - 5 = 20$

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17. Find the root of the equation  $x \cdot x^{\frac{1}{2}} = 8$ . (Simplify the left side by using the rule for

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